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THE WASHINGTON SPECIES OF DRABA.[1]

BY EDWIN BLAKE PAYSON AND HAROLD ST. JOHN.

The genus *Draba*, a member of the *Cruciferae*, is well represented in western North America. In the State of Washington one or more species are to be found in nearly every part. The arid plains of eastern Washington produce several species. These are all annuals, that shoot up with the first warm days of February or March. Until April they form a conspicuous part of the vegetation, carpeting the grassy slopes with white or yellow. As soon as the warm dry summer comes, they dry up, drop their seeds, and disappear. In western Washington they are also to be found, chiefly in sandy places at low elevation. The only one of the annuals that can be considered a montane species is *D. stenoloba*. Most of the annuals have broad ranges, occurring over a large part of the continent. They have been carefully studied and well classified elsewhere.

The perennials have proven a much more interesting group. One of these, *D. Douglasii*, occurs east of the Cascade Mountains, on the dry stony foothills, and *D. caeruleomontana* with its var. *Piperi* is found in the Blue Mountains. *D. Douglasii* is the species with its pods so swollen, subovoid in shape, that its right to a place in the genus *Draba* is questionable. Dr. Gray first proposed to call it the new genus *Cusickia*, then published it as *Draba Douglasii*, then later renamed it as *Braya oregonensis*. The other perennials are all montane species, mostly low matted cushion-like plants. Dr. Piper knew four species of the perennials from the State at the time of the publication of his Flora of Washington in 1906. This interpretation remained unchanged in Piper and Beattie's subsequent

[1]Contribution from the Department of Botany of the State College of Washington, No. 18.

books, the Flora of Southeastern Washington in 1914, and the Flora of the Northwest Coast in 1915. Since then the Blue Mountains, the Cascade Mountains, and the Olympic Mountains have yielded treasures. Each mountain peak is likely to have one or two species of perennial *Drabas*. These are often very local or endemic species, and, as is here demonstrated, a number of them are new species.

This joint study was begun with Dr. Payson two years before his death.[1] Though it has been necessary for the later author to complete it alone, the manuscript was in an advanced state of preparation, and the opinions here expressed truly represent those of the two authors.

The most valuable specific characters have been found in the habit and duration of the plant, the shape and size of the pod, the color of the flower, the shape and size and nature of the leaves, and especially in the kind and location of the pubescence on the leaves. Curiously enough, such characters as the presence of cilia, of branched or stellate hairs on the leaves seem to be the most constant and diagnostic points. On the other hand, the pubescence of the pod is of relatively little value. There are several pairs of plants that differ conspicuously by one of the pair having glabrous pods, and the other having markedly pubescent pods. Some botanists treat these as distinct species. However, the two have identical ranges, or over-lapping ranges. In the second case, the rarer one appears occasionally and then always within the range of the commoner and more widely dispersed plant. No other characters have been detected to separate the two. They are identical in every regard but the pubescence or lack of pubescence on the pod. In such cases, one plant is here considered to be a variety of the other.

Unless otherwise indicated the specimens studied and cited are in the Rocky Mountain Herbarium or in the Herbarium of the State College of Washington. In order to understand the relationship of the new species here proposed to the older species, it has been necessary to compare them with the types or with authentic material of the later. It is a pleasure to express hearty thanks for the loan of such valuable material, by Dr. B. L. Robinson of the Gray Herbarium, by Dr. William R. Maxon of the U. S. National Herbarium, and by Dr. W. A.

[1] Edwin Blake Payson died in Denver, Colo., on May 15, 1927.

Setchell of the University of California. The librarians of the Missouri Botanical Garden and of Stanford University have kindly aided the writers by the loan of rare books.

KEY TO THE WASHINGTON SPECIES OF DRABA.

A. Annuals, not caespitose,
  B. Petals deeply bifid, white; pods 3–7 mm. long, at least the lower much shorter than the pedicels,
    C. Pods broadly elliptic to obovate,.....1. *D. verna*, var. *Boerhaavii*.
    C.′ Pods elongate, oblong or lance-oblong,....1a. *D. verna*, var. *major*.
  B.′ Petals entire or emarginate,
  D. Petals white; flowers dimorphous,
    E. Inflorescence in fruit short and compact; leaves mostly basal,
      F. Leaves coarsely hispid above with simple hairs.....
        2. *D. caroliniana*, subsp. *typica*.
      F.′ Leaves hoary above with forked hairs,
        G. Pods hispidulous with mostly simple hairs,.....
          2a. *D. caroliniana*, subsp. *stellifera*.
        G.′ Pods glabrous,.....
          2b. *D. caroliniana*, subsp. *stellifera*, var. *Hunteri*.
    E.′ Inflorescence in fruit a long raceme; stems leafy,.....
      3. *D. viperensis*.
  D.′ Petals yellow; inflorescence in fruit elongate; flowers all alike and not cleistogamous,
    H. Pods 3–10 mm. long; pedicels usually much longer than the pods,
      I. Pods puberulent,.....4. *D. nemorosa*.
      I.′ Pods glabrous,.....4a. *D. nemorosa*, var. *leiocarpa*.
    H.′ Pods 10–15 mm. long; pedicels mostly shorter than the pods.....5. *D. stenoloba*.
A.′ Perennials, or biennials,
  J. Plant leafy stemmed,
    K. Biennial; style 1–2 mm. long; pods broadly elliptic to oblong, 4–5 mm. wide,.....6. *D. aureola*.
    K.′ Perennial; style about 0.1 mm. long; pods lanceolate to narrowly oblong, 2–3 mm. wide,.....7. *D. cascadensis*.
  J.′ Plant scapose or nearly so,
    L. Style 0–0.5 mm. long; leaves stellate pubescent,
      M. Pods linear, usually twisted, 10–15 mm. long,
        N. Stems glabrous, or at least so above,
          O. Pods glabrous,.....8. *D. lonchocarpa*.
          O.′ Pods puberulent on the margins,.....
            7a. *D. lonchocarpa*, var. *semilonsa*.
        N.′ Stems and pedicels stellate pubescent,.....
          8b. *D. lonchocarpa*, var. *vestita*.
      M.′ Pods ovate-lanceolate, 2–5 mm. long,.....
        9. D. *novolympica*.

L.′ Style 0.5–2 mm. long,
P. Leaves with simple cilia, lacking any stellate or branched hairs,
Q. Pods subovoid; flowers white; cilia on leaves short and weak,.....10. *D. Douglasii.*
Q.′ Pods strongly flattened; flowers yellow; cilia long and stout,.....11. *D. Nelsonii.*
P.′ Leaves with some branched or stellate hairs,
R. Leaves oblanceolate to suborbicular,.....12. *D. ruaxes.*
R.′ Leaves linear or slightly spatulate,
S. Leaves with few stellate or branched hairs, prominently ciliate with stout distant simple cilia,
T. Pods puberulent with simple or forked hairs,.....13a. *D. caeruleomontana*, var. *Piperi.*
T.′ Pods glabrous,.....13. *D. caeruleomontana.*
S.′ Leaves with many branched or stellate hairs,
U. Leaves linear, strongly ciliate to the tip, loosely pubescent with hispid and branched hairs,.....14. *D. Paysonii.*
U.′ Leaves narrowly linear-oblanceolate, ciliate towards the base, softly stellate with short more or less appressed hairs,
V. Pods puberulent,.....15. *D. incerta.*
V.′ Pods glabrous,.....15a. *D. incerta*, var. *laevicapsula.*

1. **Draba verna** L., var. **Boerhaavii** Van Hall, Specim. bot. 149, 1821.

Erophila Boerhaavii (Van Hall) Dumort. Fl. Belg. 120, 1827.
Erophila spathulata Lang, Syll. Soc. Ratisb. 1: 180, 1824.

Annual, rosulate at base; roots fibrous and with a slender taproot; leaves all basal, obovate-spatulate subacute, entire or 1–3-dentate on each side narrowed into a petiole, pubescent above and somewhat so beneath with mostly branched hairs, petioles ciliate with simple hispid hairs, 4–20 mm. long, 2–5 mm. broad; stems one to several, pubescent below with short simple or branched hairs, glabrous above, 1–10 cm. tall; inflorescence racemose, becoming loosely so after anthesis, 5–10-flowered; pedicels slender, flexuous ascending, glabrous, 5–20 mm. long; flowers small, 1–2 mm. long; sepals obovate green, yellowish or whitish hyaline on the margins, 1–1.4 mm. long, glabrous or hispid; petals white, cleft to about the middle into two elliptic lanceolate lobes, 1–2 mm. long; stamens 6, anthers globose 0.3 mm. long, filaments linear; nectar glands conical lateral, i. e. at the base of the short filaments; pods glabrous veiny, broadly elliptic to obovate, 3.5–6 mm. long, 3–4 mm. broad, style minutely apiculate.

Distribution: Upper Sonoran and Humid Transition. Type: On an old city wall of Delft, in abundance, *J. Van Spyk Vermeulen.*

Benton County: Gravelly beach of Columbia River, Paterson, April 9, 1927, *St. John, English, Jones & Mullen* 8066.

Klickitat County: Very abundant at Bingen, April 11, 1921, *Suksdorf* 10702.

Skagit County: Anacortes, April 11, 1925, *Edith Hardin;* clay bank, Anacortes, April 12, 1925, *Hardin;* rocky bluff, Weaverling's Spit, near Anacortes, April 25, 1925, *Hardin.*

Spokane County: Near Fort Wright, April 3, 1920, *Nettie M. Cook.*

Whitman County: Rocky hillside, Wawawai, April 2, 1927, *Brigido Villaneuva;* Wawawai, April 2, 1927, *Thos. Onstott;* slopes of Wawawai Canyon, March 6, 1921, *St. John* 5881.

It is not an original observation to notice variation within the Linnean species *Draba verna.* Many botanists, especially those of Europe, have distinguished and named these variants. Depending on the view-point of the worker, these have been given every rank from forma to species, and the species kept in *Draba* or made the separate genus *Erophila.* The plants have been shown to be cleistogamous. As a result of this method of fertilization, many small variants or races have arisen within the group. These breed true and usually have natural, though very restricted ranges. The French botanist Alexis Jordan described over 200 of these as elementary species. Few botanists of the present time consider them all of specific value, but the majority of the recent European workers give them a taxonomic status. Noteworthy among these botanists are Is. Maranne, G. C. Druce, and O. E. Schulz.

Draba verna has been considered an introduced species in North America. Perhaps from this reason and perhaps from the fact that it is relatively uncommon in the eastern and older settled parts, it has been given but little study. It is almost a fixed tradition among the botanists of North America to discount or overlook any variation in the species and call all collections of it *Draba verna.*

In the State of Washington the plant is very abundant on the arid plains of the eastern part. It is occasional at low elevation near Puget Sound in western Washington. Here the plants have short rounded pods, so conspicuously different from the long narrow ones of the east side plants, that even beginning students notice the difference and are puzzled by it. On investigating them, it was obvious that they had ranges that only partially overlapped and had morphological characters that were relatively constant and conspicuous. Hence these two variants are being maintained by the writers.

A number of the botanists who have made a prolonged study of the group segregate it as the genus *Erophila.* These include Is. Maranne[1] and O. E. Schulz.[2] The only tangible character to justify this is the possession of two-lobed petals, instead of the entire, or frequently emarginate, or shallowly lobed ones of *Draba.* To the writers this solitary

[1]Bull. Soc. Bot. France 60: 379, 1913.

[2]Pflanzenreich iv. fam. 105: 343, 1927.

character, though a morphological one of the flower, seems to be one of degree only, and to be relatively unimportant. The lack of any important correlated characters, of any difference in habit, or in range, convince them that these annual plants with cleft petals are best kept in the genus *Draba*. In agreement with this point of view are Dalla Torre and Harms, Engler and Prantl, Halacsy, and many others.

1a. **D. verna** L., var. **major** Stur, Oester. Bot. Zeitschr. 11: 153, 195, 1861.

Erophila majuscula Jord. Pugill. 11, 1852; Diagn. 244, 1864.
Draba verna L., var. *majuscula* (Jord.) Grenier, Fl. Jurass. 63, 1865.

Annual, similar to var. *Boerhaavii*, but the leaves often more coarsely dentate; the petals 2.5–4 mm. long; and the pods elongate, oblong or lance-oblong, 5–8 mm. long, 1.5–2.5 mm. broad.

Distribution: Upper Sonoran and Arid Transition. Type: Bucovinae (Rumania).

Asotin County: Grassy hillside, Birch Creek, T. 7 N., R. 47 E., May 22, 1927, *St. John* 8166.

Benton County: Muddy beach of Columbia River, Plymouth, April 9, 1927, *St. John, English, Jones & Mullen* 8046; gravelly beach of Columbia River, Paterson, April 9, 1927, *St. John, English, Jones, & Mullen* 8067.

Franklin County: Palouse Falls, April 15, 1928, *Nettie M. Cook.*

Skamania County: Dog Creek near Cooks, April 24, 1922, *Suksdorf* 10780.

Spokane County: Dry rocky bench above Bonnie Lake, May 30, 1923, *St. John, Pickett & Warren* 3197.

Walla Walla County: Walla Walla, April 20, 1898, *Leckenby;* rocky slopes, Waitsburg, April 18, 1898, *Horner* 606.

Whitman County: Malden, April 27, 1922, *V. A. Griffeth;* grassy hillside, Pullman, April 23, 1927, *B. Villanueva;* dry open slopes, north bank of Palouse River, below Colfax, April 29, 1922, *St. John* 2974; hillsides, Wawawai Canyon, April 3, 1926, *G. N. Jones* 733; grassy hillside, head of Hatwai Creek, May 27, 1928, *St. John* 9523.

Field notes kept by Mr. St. John show that this plant is excessively common over most parts of eastern Washington at moderate elevation.

2. **D. caroliniana** Walt., subsp. **typica,** subsp. nov.

D. caroliniana Walt., Fl. Carol. 174, 1788.

Slender annual; roots small and fibrous; leaves mostly basal, forming a rosette, entire or rarely 3-denticulate, obovate or suborbicular-spathulate, cuneate at base or short petioled, rough pubescent with branched hairs, especially beneath, 5–15 mm. long; cauline leaves few, borne on the lower quarter of the scape-like stem, similar to the basal but pubescent above with mostly long simple hispid hairs; stem at anthesis 3–8 cm. tall, at fruiting time up to 14 cm. tall, slender, simple or frequently branched from the base, hispid below with simple and forked hairs, glabrous above; inflorescence sub-umbellate, becoming cymose or at times short racemose,

6–16-flowered; pedicels slender short 1–5 mm. long, glabrous; flowers dimorphous, the first and central branch and other strong branches bearing large petaliferous flowers, these with sepals ovate, sparsely hispid on the back or glabrous, 1.5–2 mm. long; petals white 3.5–4 mm. long, with a slender claw half as long as the blade, the blade obcordate, emarginate at the tip; stamens 6, anthers ellipsoid, 0.5 mm. long, filaments subulate; nectar glands wanting; cleistogamous flowers borne on weak lateral or late branches, sepals linear-oblong, sparsely hispid toward the tip or glabrous, 1–1.5 mm. long; petals narrowly spathulate, equaling the sepals or shorter or frequently entirely wanting; stamens 4 or 6, the anthers minute 0.2 mm. long, the filaments capillary; pods ascending, often in a subumbellate cyme, linear, straight or curved, somewhat cuneate at the base, rounded at the tip, compressed and flat, with a prominent midrib and visible netted lateral veins, glabrous, 1.3–2 mm. broad; style wanting; stigma small and depressed.

DISTRIBUTION: Zone not known. TYPE: None mentioned.

WASHINGTON: *Howell* in 1882 (according to O. E. Schulz); Cascade Mts., 1882, *Tweedy* 162.

There is a possibility that these collections did not come from the State of Washington. Their data is meager, and has perhaps been confused. This true species has not been re-collected in the State. However, O. E. Schulz in his treatment in the Pflanzenreich cites another Howell collection from Umatilla, Oregon, which is just across the Columbia River from Washington. All other collections that he cites are from east of the Rocky Mountains.

The new name subsp. *typica* applies to the original *D. caroliniana* Walt. The writers have no desire to complicate in an unnecessary way the nomenclature of this group, and they realize the reluctance of the botanists in America to adopt long cumbersome names with many subdivisions. In this case, *D. carolinana* falls into five or six subdivisions, each with the characters that are considered of varietal value in this genus. Then the pubescence of the leaves assembles these into two groups which logically need names in a category superior to the variety. These are almost strong enough to be considered species, but they all have that habital resemblance, which so often is the deciding factor in such cases. Hence the original *D. carolinana* is here named as subsp. *typica*. Under this should be classified the var. *micrantha* (Nutt.) Gray, and probably the var. *dolichocarpa* O. E. Schulz, though material of this has not been examined.

2a. **D. caroliniana** Walt., subsp. **stellifera** (O. E. Schulz) comb. nov.

D. caroliniana Walt., f. *stellifera* O. E. Schulz, Pflanzenreich IV, fam. 105: 333, 1927.

Differing from the var. *micrantha* by having the upper leaf surface of the cauline leaves as well as the rest of the leaf rough pubescent with white branched hairs. The leaves are also sparsely ciliate with simple hispid hairs towards the base, and occasionally a few of these simple hairs are to be found on the upper surface near the petiolar base. The nature

and position of the pubescence on the leaves is one of the most constant and fundamental characters to be found in the genus *Draba*. On the other hand the pubescence or smoothness of the pods seems of minor importance, as there are many pairs of plants differing in no other way, occurring together and having no distinct ranges. Only in the far western part of North America are these plants with the branched pubescent cauline leaves to be found. Because of this fundamental character which is correlated with a geographic range, the plant is raised to the category subspecies.

Distribution: Upper Sonoran. Type: Not indicated, but the specimens were from Idaho, Washington, and California. The first mentioned was Idaho: Upper Ferry, Clearwater River, Lewiston (J. H. Sandberg, D. T. MacDougal, A. A. Heller, 1892, n. 141).

Grant County: Steep coulee slope, above Fish Hatchery, head of Crab Creek, n. e. of Moses Lake, March 31, 1921, *St. John* 6028.

Spokane County: Spokane, May 23, 1897, *Piper*.

Walla Walla County: Dry rocky south slopes, Waitsburg, March 27, April 22, 1897, *Horner* 74.

Whitman County: Almota, May 2, 1897, *Piper & Sheldon;* Snake River bluffs, Wawawai, April 17, 1897, *Piper* 2801.

Yakima County: North Yakima, May 27, 1892, *Henderson*.

2b. **D. caroliniana** Walt., subsp. **stellifera** (O. E. Schulz) Payson and St. John, var. **Hunteri** var. nov.

It differs from the subsp. *stellifera* only by having the pods glabrous.

A subsp. *stellifera* differt in siliquis glabris.

Distribution: Upper Sonoran. Type: Ephrata, *St. John* 6006.

Asotin County: Sandy soil, Clarkston, March 17, 1900, *B. Hunter* 1.

Grant County: Course red sand, ridge n. of Ephrata, April 1, 1921, *H. St. John* 6006 (type in Herb. State College of Washington).

Yakima County: Rattlesnake Hills, March 20, 1924, *Ramaley*.

The following specimen has also been examined from Idaho: Lewiston, Nez Perce Co., March 17, 1900, *Hunter*.

3. **D. viperensis** St. John, sp. nov.

Slender annual; roots small white fibrous, with a definite taproot and thread-like laterals; basal leaves several, forming a rosette, but most of these leaves withering after anthesis, oblanceolate to obovate, narrowed to a short petiole, remotely few dentate near the tip, hispid with simple white hairs on the upper surface on the petiole and near the base, elsewhere densely white hispid with stellate and forked hairs, the petiole ciliate with simple hispid hairs, 5–20 mm. long, 3–10 mm. broad; cauline leaves 4–6, evenly distributed on the lower half of the plant, not or scarcely reduced upwards, ovate-lanceolate to elliptic-lanceolate or oblanceolate sessile, remotely but sometimes deeply dentate, similarly pubescent to the basal leaves, 5–26 mm. long, 2–15 mm. broad; stems slender, spreading white pilose with mostly stellate hairs, also with simple and forked hairs, 4–25

cm. tall, the large plants producing lateral branches from one or several of the upper nodes, these lateral branches markedly leafy up to the first flower; terminal inflorescence a loose raceme even during anthesis, 5–50-flowered, but only a minority of these setting fruit, similarly pubescent to the stems; pedicels slender, somewhat ascending, white pilose with mostly forked and stellate hairs, pedicels 5–12 mm. long; sepals hyaline margined, green becoming yellowish, the outer lanceolate-elliptic, the inner elliptic-obovate, 2 mm. long, markedly white simple pilose; petals white, with an obcordate blade tapering into the slender claw one third its length, 4 mm. long; stamens 6, 2–2.5 mm. long, the anthers cordate to suborbicular, 0.4 mm. long, the filaments subulate somewhat inflated at the base; nectar glands lateral, that is one on either side of each of the two short stamens, deltoid, conical, the median glands wanting; inflorescence of lateral branches short and subcymose at anthesis; sepals oblong-elliptic slightly unequal, 1–1.5 mm. long; petals similar in shape to those of the macranthous flowers but smaller unequally developed not exceeding the sepals or rarely one of them so doing; stamens 6, 1.5–1.7 mm. long, the anthers reniform to broadly cordate, 0.1 mm. long, the filaments filiform and narrowly deltoid at base; nectar glands none; pods flat compressed, broadly elliptic, white puberulent with ascending simple hairs, 5–8 mm. long, 2–3 mm. wide, not contorted, style wanting or nearly so; stigma depressed; ovules 30–48; mature seeds brown elliptical or oblong, flattened, 0.6–0.7 mm. long.

Annua, foliis rosulatis oblanceolatis vel obovatis petiolatis dentatis pilis simplicibus bifurcis stellatisque hispidis 5–20 mm. longis 3–10 mm. latis, foliis caulinis 4–6, inflorescentiis terminalibus laxe racemosis 5–50-floris, floribus dimorphis, petalis albis obcordatis 4 mm. longis, siliculis ellipticis puberulis 5–8 mm. longis 2–3 mm. latis.

Distribution: Upper Sonoran. Type: Big Canyon Creek, Idaho, *Skillin & Warren* 720.

Asotin County: Rocky hillside, Buffalo Rock, T. 8 N., R. 47 E., May 29, 1927, *H. St. John, P. Gaona, G. N. Jones & F. Warren* 8251.

The following specimens from other States have also been examined:

Oregon: Grassy slopes, 1300 ft. alt., Somers Creek, T. 2 N., R. 50 E., Wallowa Co., May 8, 1927, *H. St. John* 8145; gravel slopes near mouth of Tryon Creek, 1100 ft. alt., T. 3 N., R. 50 E., Snake River Canyon, Wallowa Co., May 18, 1929, *St. John* 9828.

Idaho: Dry rocky hillsides near camp, Big Canyon Creek, T. 27 N., R. 2 W., Idaho Co., April 6, 1928, *J. H. Skillin & F. A. Warren* 720 (type in Herb. State College of Washington).

D. viperensis is a member of the Section *Tomostima*, which is remarkable for having dimorphic flowers. The terminal racemes bear large flowers with showy petals and nectar glands, while the lateral racemes have much smaller inconspicuous and apparently cleistogamous flowers with reduced petals, minute anthers and no nectar glands. The showy flowers often fail to set fruit, while the micranthous ones do so abundantly. This section contains six species of North and South America. The only one of these recognized species occurring in the Pacific Northwest is *D. caroliniana* Walt. with its subspecies The species here described as new,

most closely resembles one native from Uruguay to Tierra del Fuego. The two may be distinguished as follows: *D. australis* R. Br. has the stem in fruit up to 10 cm. tall, branched from the base, long aphyllous above, appressed puberulent below, glabrous above; the cauline leaves often subopposite or subverticillate; the micranthous flowers with linear sepals and four stamens. *D. viperensis* St. John, on the other hand, has the stem in fruit up to 25 cm. tall, simple or branched from the upper axils, leafy to the inflorescence, spreading pubescent throughout, the cauline leaves alternate; and the micranthous flowers with oblong-elliptic sepals and six stamens.

This new species has been found only in the Snake River Canyon, from 20 to 70 miles upstream from Lewiston, Idaho. The Idaho and Oregon localities are within two miles of each other, but are on opposite sides of the Snake River and are in different States. In allusion to the name of the river and canyon, the specific name has been derived from the Latin *vipera*, a snake.

4. **D. nemorosa** L., Sp. Pl. 2: 643. 1753.

D. nemorosa L., var. *brevisiliqua* Zapalowicz, Rozpr. Wydz. Mathem.-Pryzr. Akad. Umiej. Ser. III, 12B: 238, 1912.

D. nemorosa L., var. *macrocarpa* Korshinsky, Tentam. Fl. Ross. Or. 37, 1898.

Annual, slender or often vigorous and tall; roots fibrous; basal leaves often forming a rosette, but in small plants sparse and scarcely so doing, oblanceolate to oblong-obovate, obtuse to subacute, tapering to a short petiole, entire or with a few serrate or denticulate teeth, pubescent throughout with white forked or stellate hispid hairs, 2–25 mm. long, 1–10 mm. broad; cauline leaves several remote borne on the lower portion of the main stem, though running well up on the lateral branches, oblong-lanceolate to elliptic-ovate, sessile usually rounded at base, serrate with a few remote teeth, hispid above with simple or two-forked hairs and below with forked or stellate hairs, 3–25 mm. long, 2–17 mm. broad; stem simple in small or depauperate plants, the larger plants producing numerous ascending lateral branches from the base or lower axils, white hispid below with simple, forked, and stellate hairs, glabrate above, 2–45 cm. tall; inflorescence at anthesis a short loose raceme, greatly elongating in fruit, in large plants the inflorescence is often several times the length of the rest of the plant, bearing 4–50 or more flowers; pedicels slender somewhat ascending or divergent, 5–25 mm. long, at least the lower usually much longer than the pods; sepals oblong-ovate yellowish, more or less simply pilose on the back, about 1.5 mm. long; petals pale yellow usually fading to whitish, oblong-spatulate narrowed to a claw below and deeply emarginate, 2.5 mm. long; stamens 6, 1.5–2 mm. long, the anthers orbicular-cordate, 0.2 mm. long, the filaments subulate; nectar glands lateral depressed conical; pods narrowly elliptic-oblong tapering to a cuneate base and an apiculate tip, puberulent with short simple ascending hairs, flat and compressed, 3–10 mm. long, 1.5–2.5 mm. broad; style wanting; stigma minute.

DISTRIBUTION: Upper Sonoran to Arid and Humid Transition. TYPE: In Sueciae nemoribus.

WASHINGTON: Cascade Mts., 1882, *Tweedy* 164.

BENTON COUNTY: Sandy shore of Columbia River, Hanford, April 7, 1927, *St. John, English, Jones & Mullen* 8117; gravelly beach of Columbia River, Paterson, April 9, 1927, *St. John, English, Jones & Mullen* 8068.

CHELAN COUNTY: Damp land near mouth of Wenatchee River, April 16, 1905, *Whited* 2591.

SAN JUAN COUNTY: Dry rocks near Station, Friday Harbor, July 28, 1923, *Peck* 13152.

SKAGIT COUNTY: Rocky bluff, Weaverlings Spit, Anacortes, April 25, 1925, *Hardin.*

SPOKANE COUNTY: Hangman Creek, 1510 feet, May 16, 1893, *Sandberg & Leiberg* 4; Spokane, April 20, 1913, *Turesson.*

WALLA WALLA COUNTY: Bottom land, Waitsburg, March 1, April 19, May 6, 1898, *Horner* 608.

WHITMAN COUNTY: In dry ground, Almota, April 7, 1894, *Piper;* dry slopes, n. bank Palouse River, below Colfax, April 29, 1922, *St. John* 2975; rare, in dry ground, Pullman, May 1, 1894, *Piper* 1794; in dry rocky places, Pullman, May 16, 1895, *Piper* 1794; in dry places, Pullman, April 5, 1895, *Cloud;* on basaltic outcroppings, Pullman, May 1897, *Elmer* 151; Pullman, May, 1899, *Hunter;* dry soil, low ground, Pullman, April 4, 1906, *Hunt & Kimmel* 70; dry hillside, Rock Lake, April 9, 1925, *St. John, Pickett & Warren* 6884, and 6891; along Snake River at Wawawai, April 17, 1897, *Piper* 2800; rocky slopes of Snake River Canyon above Wilma, April 16, 1922, *St. John* 3309; sunny ledge, Granite Point, March 12, 1921, *St. John & Pickett* 2992.

YAKIMA COUNTY: In bottoms of canyons, near springs, Rattlesnake Mts., May 7, 1902, *Cotton* 563.

4a. **D. nemorosa** L., var. **leiocarpa** Lindbl., Linnaea 13: 33, 1839.

D. lutea Gilib., Fl. Lith. 2: 46, 1781.

Differing from the species only by having glabrous pods.

DISTRIBUTION: Humid Transition. TYPE: Dalekarliae Suec. (Wahlenberg et *Hartman*).

ISLAND COUNTY: Sandy bluffs, Whidby Island, April 17, 1897, *Gardner* 25.

KLICKITAT or YAKIMA COUNTY: Klickitat River, June 22, 1899, *Flett* 1142 in part.

5. **D. stenoloba** Ledeb., Fl. Ross. 1: 154, 1841.

D. deflexa Greene, Pittonia 4: 20, 1899.
D. nitida Greene, Pl. Baker. 3: 7, 1901.

Annual, usually distinctly rosulate at base; roots fibrous, branching from a distinct taproot; basal leaves on all well developed plants forming a distinct rosulate tuft, the first leaves and those on small plants obovate,

the later ones on large plants oblanceolate to linear-oblanceolate with a marked petiolar base, ciliate with simple hispidulous hairs, pubescent beneath with mostly branched hairs, sparsely hispid or branched pubescent above and often glabrate; cauline leaves one to several sessile elliptic or ovate lanceolate, entire or few toothed, sparsely pilose above and branched pubescent beneath; stems one, or with several secondary ones, simple or with weak axillary branches, hispidulous and forked pubescent below and glabrous above, slender, 4–35 cm. tall, the inflorescence often exceeding the leafy portion of the stem; inflorescence becoming loosely racemose, 3–40-flowered glabrous; pedicels stiff, slightly ascending, exceeded by, or all but the lower exceeded by the pods; flowering tip of the raceme small compact and cymose; sepals elliptic obovate, sparsely white pilose or branched pubescent on the back, 1–3 mm. long; petals oblanceolate emarginate narrowed to a slender claw, pale yellow or tipped with violet, fading to white, 2–4 mm. long; stamens 6, the anthers cordate 0.2 mm. long, the filaments subulate 2 mm. long; nectar glands lateral small and conical; pods flat compressed linear or somewhat arcuate glabrous, 10–15 mm. long, 1–2 mm. wide; style wanting.

Distribution: Hudsonian. Type: In ins. Unalaschka! (Chamiss., Eschsch.).

Washington: Cascade Mts., 1882, *Tweedy* 163.

Chelan County: Stevens Pass, 3950 ft., Cascade Mts., August 16, 1893, *Sandberg & Leiberg* 758.

Clallam County: Olympic Mts., July 21, 1897, *Flett* 102. This is probably from Clallam Co., though not definitely so stated.

Columbia County: Dry open places, Oregon Butte, T. 7 N., R. 41 E., July 23, 1913, *Darlington* 349.

Kittitas County: Common on wet banks of streams, which flow through dense woods, Wenatchee Mts., July 1897, *Elmer* 434; somewhat shady places, 5300 ft., Wenatchee Mts., July 1, 1903, *Cotton* 1288.

Pend Oreille County: Gravelly upper slopes of Round Top Mt., June 19, 1924, *St. John* 6417.

Yakima County: Subalpine meadow, 6000 ft., Nile Creek, Bald Mt., July 22, 1923, *St. John* 7816.

Whatcom County: Grassy slopes among loose stones, 6000 ft., Mt. Baker Mining Dist., July 4, 1898, *Flett* 851; dry hillslope, Twin Lakes, September 4, 1927, *Hardin* 325.

It will be seen from the synonymy that the name *D. stenoloba* Ledeb. is being maintained in the sense of Gray and of Piper for this yellow-flowered annual. Recently several authors have adopted other names for this species in the United States, indicating that Gray and Piper had misapplied Ledebour's name. Dr. E. L. Greene seems to have started this when he described *D. nitida* from specimens collected in the mountains of Colorado. He wrote, "The plant is one which has been referred erroneously to *D. stenoloba*." This characteristic categorical statement of Dr. Greene's does not give any contrasting characters to separate his new species from *D. stenoloba*, or any explanation as to the true nature of *D. stenoloba*. There is a duplicate type of *D. nitida* Greene, *Baker* 492, in

the Herbarium of the State College of Washington, and a duplicate type of *D. stenoloba* Ledeb., including both the *Chamisso* and *Eschscholtz* plants from Unalaschka, in the Gray Herbarium. It has been possible with the original descriptions in hand to compare these authentic specimens. No hint of a difference in any part of the plants could be discovered.

Draba deflexa was described by Dr. Greene from a collection made at Camp Stambaugh, Wyoming, by Dr. Maghee in 1878. This consists of a single plant. It has a compact rosulate tuft of leaves, and a strong central stem. This is stouter than in the specimens of *D. stenoloba* and the lower pedicels are conspicuously slender and deflexed. Even the first glance will reveal that this stem terminates in a heavy clavate fasciate expansion. The several secondary stems arising from the base and from the axils are a little slender, but otherwise normal. They are identical with stems of *D. stenoloba* and quite unlike the heavy stem with deflexed pedicels, which they surround. It is obvious, we believe, that this specimen is a monstrosity. Annotations on the type sheet indicate that Dr. E. Gilg held the same opinion. A species based on a monstrosity is invalid, as indicated by Article 51, 3, of the International Rules.

Since the above was written, Schulz's treatment of the genus in the Pflanzenreich has come to hand. He maintains all three of the species here discussed. For *D. deflexa* Greene, there seems to the writers to be no possible supporting evidence. Even if the specimens from British Columbia to Colorado could be separated as a species, they could not be called *D. deflexa*, as that was based on a single specimen, a monstrosity, and the specific name and the distinctive characters in the original description all related to this abnormal structure. As has been stated, such cases are specifically outlawed by rule. Nor can the present writers detect a second species from that area.

D. stenoloba Ledeb. is maintained by Schulz only for the original collections by Chamisso and Eschscholtz from Unalaschka. The remaining large number of collections from the mainland are put into *D. nitida* Greene, and two varieties of this are made, var. *nana* for those with the shortest pods, and var. *praelonga* for those with the longest pods. These varieties seem to the writers to be merely the extremes of the normal variation, to lack any correlated characters or any natural and distinct range. No reason is seen for their maintenance.

The question of a distinction between *D. stenoloba* and *D. nitida* is not so easily disposed of. For key characters the former has: Stems ascending 1–3-leaved; petals 4–4.5 mm. long; ovary with 16–20 ovules; while the latter has stems erect, 0–7-leaved; petals 1.5–4 mm. long; and the ovary with 24–44 ovules. These characters can be tested against the duplicate type of *D. stenoloba*, the duplicate type of *D. nitida*, as well as numerous collections of the latter from the western United States and Canada. Both have the first and central stem erect, and any later lateral branches ascending, so this character is not helpful. The number of cauline leaves is not contrasting even as stated by Schulz. To be sure *D. stenoloba* is said not to have more than 3. If more collections of this were available, it is probable that this maximum would be surpassed. The petals of the

northern *D. stenoloba* do seem to average larger than in the collections from further south. This also fails to hold as a sure distinction, for the writers have measured one of the other group running from 2 up to 4.2 mm. in length. *D. stenoloba* is said to have the ovary with 16–20 ovules, while *D. nitida* has from 22–44. The duplicate type of *D. nitida* shows 24 ovules, but *Sandberg & Leiberg* 758 shows 19–26; *St. John* 7816 shows 18–24; *St. John* 6417 shows 18–27; and *Flett* 102 shows 10–19. Hence there is no usable distinction in the number of the seeds or ovules. The actual number seems to depend on the length of the pod, that in turn on the vigor of the plant, and that probably upon the climatic conditions and the edaphic conditions of the spot where the seed of the annual happened to fall.

In the descriptions of these two species, Schulz gives additional contrasting characters. *D. stenoloba* is said to be a perennial, with the sepals 2.5–3 mm. long, the petals white?, and the stamens 2.5–3 mm. long. *D. nitida* is said to be an annual, very rarely perennial, with the sepals 1–1.5 mm. long, the petals yellow, at length violet, and the stamens 1–1.2 mm. long. These together with the key characters make quite a formidable list. However, after a careful study of a series of specimens, these too disappear. The original specimens of the Chamisso and Eschscholtz collection seen, five plants, seem clearly to be annuals and not perennials. Of course under special conditions any annual may live over to the second season, but all of the plants in this group seem characteristic annuals. The sepals of this series vary in length all the way from 1 to 2.5 mm. All old or poorly dried specimens of this group seem to have white flowers. The stamen length also falls down as a character, examples having been measured all the way from 1 to 3 mm.

A second detailed comparison of this group has failed to show any reason for maintaining *D. deflexa* Greene or *D. nitida* Greene.

6. **D. aureola** Wats., Bot. Calif. 2: 430, 1880.

Biennial, or according to Watson sometimes of longer duration, though no evidence to support this has been seen by the writers; roots white, long and slender, unbranched above, with fibrous lateral rootlets below; stems of the first year's growth becoming deeply buried by the loose sliding volcanic soil; stems of the second year simple or somewhat branched, 4–10 cm. high, densely leafy even up into the inflorescence, densely white hispidulous with simple and a few forked hairs; leaves often reflexed below and ascending above, so numerous and massed as to appear imbricate, narrowly spatulate, densely white forked pubescent throughout and long white ciliate, thick and fleshy with the veins scarcely visible, 5–25 mm. long, 1.5–4.5 mm. wide; racemes simple or compound, but always with a strong central one, 30–50-flowered hispidulous with white mostly forked hairs; pedicels ascending, forked or simple hispidulous, 4–8 mm. long; sepals yellowish, smooth or sparsely hispidulous; petals bright yellow and drying yellow, 4–5 mm. long, spatulate emarginate or obtuse; stamens 6 3.5–5.5 mm. long, the anthers elliptic-oblong 1 mm. long, the filaments

subulate; nectar glands lateral minute conical; pods flattened oblong-lanceolate or elliptic, densely short white forked hispidulous, 10–14 mm. long, 4–5 mm. wide, beaked with a prominent style 1–2 mm. long.

Distribution: Arctic-Alpine. It is apparently confined to fine loose volcanic soils at high elevations on Lassen Peak, Calif., Diamond Peak and the Three Sisters, Ore., and Mt. Rainier, Wash. Type: Sierra Nevada, in Sierra County (*Lemmon*), and on Lassen's Peak, *Mrs. Austin.*

Pierce County: Alt. 10,000 ft., Mt. Rainier, August, 1889, *Piper & Smith* 699 (Gray Herb.); in volcanic sand, 10,000 ft. alt., Mt. Rainier, August, 1895, *Piper* 2061; in rock talus, 10,000 ft. alt., Mt. Rainier, August, 1897, *Flett* 286; Ruth Mt., 8,700 ft. alt., August 21, 1919, *Flett* 3168; dry volcanic soil, Camp Muir, 10,000 ft., Mt. Rainier, August 14, 1927, *Warren* 574.

7. **D. cascadensis** sp. nov.

Perennial with a stout tap-root and numerous strong laterals; crown branching and multicipital, bearing numerous short stems that elongate each year up to the ground surface; basal leaves forming a rosette, oblanceolate narrowed to a slender petiole, remotely dentate, soft white stellate pubescent throughout, 1–2 cm. long; cauline leaves 2–6, remote, lanceolate to ovate-lanceolate remotely dentate, soft white stellate pubescent throughout and with a few hispid cilia near the base, sessile, 7–15 mm. long, 3–5 mm. wide; stems simple or branching, soft white stellate pubescent throughout and white hispid especially below, 5–10 cm. tall at anthesis, 15–18 cm. tall at maturity, stems all erect, and in old plants with many stems making a compact bushy growth; inflorescence at anthesis appearing subcapitate, soon elongating into a loose raceme 2–9 cm. long; pedicels white stellate ascending, 3–5 mm. long; lowest flower leafy bracted; sepals ovate to ovate-oblong, densely white pilose, 1.5 mm. long; petals pale yellow, oblanceolate emarginate notched, 3.5 mm. long; stamens 6, 1.5–2.5 mm. long, the anthers cordate apiculate, 0.2 mm. long, the filaments linear; nectar glands conical, lateral, i. e. on either side of the base of the two short filaments; pods linear-oblong, tapering to either end, puberulent with white stellate and simple hairs, flat and compressed, 8–12 mm. long, 1.7–2 mm. broad; style 0.1 mm. long.

Perennis, caulibus foliosis, foliis utrinque pube stellata obtectis, petalis flavis 3.5 mm. longis, siliculis stellatis compressis lineari-oblongis 8–12 mm. longis, stylo 0.1 mm. longo.

Distribution: Hudsonian. Type: *St. John* 6580, Glacier Peak.

Snohomish County: Alpine meadows, 6,500 feet alt., gneiss ridges on northwest slope of Glacier Peak, July 24, 1924, *Harold St. John* 6580 (type in Herb. State College of Washington).

The new *D. cascadensis* is a member of the Section *Phyllodraba* as treated in O. E. Schulz's monograph in the Pflanzenreich. It is most closely related to *D. aureiformis* Rydb., or *D. aurea* Vahl, var. *aureiformis* (Rydb.) O. E. Schulz as it is called in the monograph. The best distinctions seem to be the facts that *D. aureiformis* Rydb. has the style 0.5–1 mm. long; the

pods linear-oblong-lanceolate, 2.5–3 mm. broad; the basal leaves entire; and the cauline leaves 6–18 in number. On the other hand, *D. cascadensis* Payson & St. John has the style 0.1 mm. long; the pods linear-oblong tapering to each end, 1.7–2 mm. broad; the basal leaves dentate; and the cauline leaves 2–6 in number.

The specific name has been taken from the name of the Cascade Mountains, from the fact that the plant has been found only on one of the high peaks of that mountain range.

While studying this plant, a variation of its closest relative has been discovered. This may be described as:

D. aureiformis Rydb., var. **leiocarpa** var. nov.

Siliculis glabris. Differing from the species only in having the pods glabrous.

Colorado: Farnham, Park Co., July 11, 1891, *E. C. Smith* (type in Herb. State College of Washington.)

8. **D. lonchocarpa** Rydb., Mem. N. Y. Bot. Gard. 1: 181, 1900.

D. nivalis Liljebl., var. *elongata* Wats., Proc. Am. Acad. 23: 258,1888.

Perennial tufted and caespitose; roots slender and whitish, tap-root long and slender, lateral ones delicate; in old plants the crown branches into several short stems, each crowned with a dense rosulate mass of leaves, and these massed into a tuft; basal leaves obovate to oblanceolate or oblong-oblanceolate, tapering to a broadly winged petiole, closely imbricate, hoary with long white stellate pubescence on all parts readily visible, but ciliate near the base with long white hispid hairs, and with simple white pilose hairs on the middle and basal portions of the upper surface, 4–7 mm. long, 2–3 mm. broad; cauline leaves wanting on all specimens examined though occasionally present (fide Schulz); stems scapose, glabrous or with a few stellate hairs near the base, slender, 2–9 cm. tall; inflorescence glabrous, becoming a loose raceme, 2–8-flowered; pedicels slender glabrous, strongly ascending, 2–7 mm. long; sepals elliptic, white pilose near the tip, 2–2.5 mm. long; petals with an obovate blade, slightly or definitely emarginate, white, the claw tapering and slender, slightly shorter than the blade, petals 3.5–4 mm. long; stamens 6, 2–3 mm. long, the anther broadly ellipsoid 0.3 mm. long, the filament linear; nectar glands lateral and conical; pods linear compressed, usually twisted glabrous, 10–15 mm. long, 1 mm. broad; style 0.2–0.3 mm. long; stigma flat.

Distribution: Hudsonian. Type: Rocky Mountains, from British America to Washington, Wyoming and the Uintas.

Pend Oreille County: Crevices of limestone cliffs, Z-Canyon, June 23, 1924, *St. John* 6468.

Pierce County: Owyhigh, 5,800 ft. alt., Mt. Rainier, August 9, 1919, *Flett.*

Skamania County: Chiquash Mts., at 6,000 or 7,000 ft. alt., August 26, 1895, *Suksdorf* 2541.

Whatcom County: Mt. Baker Mining Dist., alt. 6,000 ft., July 20, 1898, *Flett* 856.

All of the specimens studied have naked scapes. Such plants will not run down in Schulz's key in his monograph in the Pflanzenreich. He puts *D. lonchocarpa* under the heading, "Caules floriferi±foliosi." To be sure, in his description of the Section *Leucodraba* and the Subsection *Euleucodraba*, allowance is made for occasional leafless stems, but there is no such provision in the key. In the Pacific Northwest this leafless condition seems to be constant, not a mere rare variation.

8a. **D. lonchocarpa** Rydb., var. **semitonsa** var. nov.

Differing from the species by having the pods short puberulent on the margins, and the petals drying yellowish.

Siliculis ad marginem puberulis, petalis flavescentibus.

Distribution: Arctic-Alpine. Type: *Piper* 2060.

Pierce County: In volcanic sand, 9,000 ft. alt., Mt. Rainier, August, 1895, *Piper* 2060 (type in Herb. State College of Washington); dry rocky soil, 8,500 ft., Mt. Rainier, June 25, 1926, *Warren* 512; rocky cliff, Indian Henry's, Crystal Mt., Mt. Rainier, July 2, 1928, *Warren* 753; rocky ledges near top, Iron Mt., Mt. Rainier, June 17, 1928, *Warren* 864.

The *Piper* specimen was studied and commented on by Schulz in his monograph (l. c. 215). He stated that it approached var. *dasycarpa* through its fruits which were sparsely pilose on the margins. The fact that it has again been collected on the same mountain, and that it occurs at higher elevations, seems to entitle it to varietal rank. The var. *dasycarpa* which has the siliques densely pubescent with simple, forked and stellate hairs, is known only from Laggan in the Canadian Rockies.

8b. **D. lonchocarpa** Rydb., var. **vestita** O. E. Schulz, Pflanzenreich IV, fam. 105: 216, 1927.

Differs from the species by having its stem and pedicels densely stellate pubescent.

Distribution: Arctic-Alpine. Type: Alaska und Kanada, i. e., Virgin Bay, *Trelease & Saunders* 3913; Mt. Arrowsmith, *Macoun* 1929.

Whatcom County: Alpine slate ledges, 6,700 ft., Grouse Ridge, Mt. Baker, August 8, 1923, *St. John* 5123.

The majority of the specimens in this collection have from 1–2 cauline leaves on the scapes. These are small, ovate dentate and sessile, 2–6 mm. long.

9. **D. novolympica** sp. nov.

Perennial, the root unknown; densely caespitose from the numerous short dichotomous branches at the surface of the ground, these slender cylindric from the persisting mass of old leaves, 2–3 cm. long; leaves narrowly linear-oblanceolate to almost linear, entire thick and coriaceous, the single nerve somewhat prominent beneath, prominently white ciliate throughout with hispid simple or forked hairs 0.7–0.9 mm. long, pubescent beneath with loose white forked or some stellate hairs, less so above, 4-5 mm. long, 0.5-0.8 mm. wide, ascending and the tips incurved; scapes slender, white

hispid with mostly forked hairs, 1–10 mm. tall; inflorescence short and subcymose even in fruit, hispid with white mostly forked hairs, 3–8-flowered; pedicels ascending, white hispid with mostly forked hairs; sepals unequal, yellowish and hyaline margined, hispid with mostly forked hairs, obovate to oblong, 2.5 mm. long, 1.5 mm. wide; petals yellow, oblanceolate, narrowed to a short claw just above the broader base, obtuse and entire, 3–3.5 mm. long, 1.5 mm. wide; stamens 6, 2–2.5 mm. long, the anthers oblong-lanceolate, cordate at base, 0.5 mm. long, the filaments subulate with a deltoid base; the nectar glands lateral pyramidal and prominent, connected by a low continuous ridge into a hippocrepiform structure; pods flat compressed, rough hispid with short stiff forked hairs, acute and ovate-lanceolate but distinctly lop-sided, 2–6-ovuled, 2–5 mm. long, 1.2–2.7 mm. broad; style stout, 0.1–0.3 mm. long, the stigma discoid and prominent; seeds (immature) brown wingless, 1.4 mm. long.

Perennis caespitosa, foliis anguste lineari-oblanceolatis integris coriaceis ciliatis utrinque pilis furcatis hispidis, scapis gracilibus 1–10 mm. altis, petalis luteis oblanceolatis 3–3.5 mm. longis, siliculis compressis ovato-lanceolatis 2–5 mm. longis, stylo 0.1–0.3 mm. longo.

Distribution: Arctic-Alpine. Type: *Flett* 844.

Olympic Mountains: Rocky summits, shale, etc., alt. 6,000 ft., August 28, 1898, *J. B. Flett* 844 (type in Herb. State College of Washington).

Yakima Region: In 1882, *T. S. Brandegee* 373 in part (Herb. Univ. Calif.).

The new *D. novolympica* is a member of the Section *Chrysodraba* according to the classification in O. E. Schulz's monograph in the Pflanzenreich. It most closely resembles a species of Greenland, Spitzbergen, and arctic Eurasia, *D. pauciflora* R. Br., var. *hebecarpa* (Pohle & N. Busch) O. E. Schulz. This arctic plant may be recognized by its leaves oblong-elliptic 5–7 mm. long, ciliate with simple hairs; the scape 5–50 mm. tall, hirsute with simple hairs 0.75 mm. long and with shorter forked hairs; the sepals 1.2–2 mm. long, hirsute; the petals 1.5–2.5 mm. long; the stamens 1.2–2 mm. long; and the ovules 12–16. *D. novolympica* Payson & St. John may be distinquished by its leaves narrowly linear-oblanceolate, 4–5 mm. long, ciliate with simple and forked hairs; the scape 1–10 mm. tall, hispid with mostly forked hairs 0.5 mm. long; the sepals 2.5 mm. long, hispid with mostly forked hairs; the petals 3–3.5 mm. long; the stamens 2–2.5 mm. long; and the ovules 2–6.

The specific name is coined from the name of the mountains where the type collection was made. The type sheet contains but one fruiting tuft. The Brandegee collection contains two plants in flower and fruit. Hence, the description of the floral parts was taken from this cotype material. As far as the plants are concerned this collection would have made a better type specimen than the one so designated. Unfortunately this *Brandegee* 373 contains a mixture of several species, presumably of several different collections. The sheet of it from the Brandegee Herbarium, now in the Herbarium of the University of California includes two plants of the new *D. novolympica*, one plant of *D. Nelsonii* Macbr. & Payson, and five plants of *D. incerta* Payson, var. *laevicapsula* (Payson) Payson & St. John. The

sheet of it in the Rocky Mountain Herbarium contains specimens of *D. Nelsonii* and of *D. Paysonii* Macbr. It is obvious that nothing but confusion would result from designating as the type a numbered collection that includes such a heterogeneous mixture as does this one.

10. **D. Douglasii** Gray, Proc. Am. Acad. Arts Sci. 7: 328, 1868.

Cusickia Douglasii Gray in synon., Proc. Am. Acad. Arts Sci. 17: 199, 1882; O. E. Schulz, Pflanzenreich IV, fam. 105: 12, 341, 1927; not *Cusickia* of M. E. Jones.

Braya oregonensis Gray, Proc. Am. Acad. Arts Sci. 17: 199, 1882.

Perennial; stems stout and woody, freely branching at or near the surface, more or less clothed with marcescent leaf-bases; leaves pale green, thick and rigid, ciliate with weak simple hairs, glabrous above, weakly more or less appressed pilose beneath, 1-ribbed, the lower oblanceolate, the upper oblanceolate-linear to nearly linear, 3–10 mm. long, 0.5–2 mm. broad; aerial stems short subequal, giving a low tufted appearance to the plant, densely leafy at the tips and clothed with partially decayed leaf bases below; the naked subscapose stem tips very short, exceeded by the leaves, or slightly exceeding them, sparsely white pilose with somewhat matted simple hairs; inflorescence 5–8-flowered small, compact at anthesis, only slightly elongating in fruit, white pilose, the pedicels 1–7 mm. long; flowers 4–5 mm. long; sepals elliptic concave green glabrous, 3 mm. long; petals white oblanceolate-spatulate clawed, 4–5 mm. long, 1 mm. broad; stamens 6, 3–4 mm. long, the anthers oblong, 0.6 mm. long, the filaments subulate; nectar glands lateral closed 6-angled hollowed, these joined with the median ones; pods subovoid scarcely flattened, rigid and coriaceous, white appressed puberulent, 4–5 mm. long, 2–2.5 mm. broad, tipped with a rigid style 1–2 mm. long; ovules 2–4 in each cell pendent, seeds 1–2 in a cell, large smooth and shining nearly filling the cavity.

Distribution: Upper Sonoran. Type: Douglas's collection in the interior of Oregon or California.

Klickitat County: Klickitat hills, May, 1895, *Howell* 50.

The fact that Dr. Gray named this species under three different genera of *Cruciferae* is a good indication of its anomalous character. The name *Cusickia* appeared only in synonymy. It was chosen and then communicated to W. C. Cusick, who had made a collection of the plant. Cusick distributed a number of specimens under this name. By the time he was ready to publish, Dr. Gray changed his mind, and called the plant *Braya oregonensis*, citing the name *Cusickia* in synonymy to indicate that he had abandoned the idea of describing it as a separate genus. It appears that he had already described the plant from a different part of its range as *Draba Douglasii*, and overlooked this fact when it was sent to him the second time.

When completing volume one, part one, of Gray's Synoptical Flora, Dr. B. L. Robinson discovered that Dr. Gray had described the plant under the two different genera. It seemed to belong in the genus *Draba*, so the earlier name was adopted in that work.

O. E. Schulz in his recent monograph of *Draba* lists *D. Douglasii* in the Species excludendae. He refers it to *Cusickia Douglasii* Gray, though Gray published this name only in synonymy. On page 12 Schulz lists the characters that separate *Cusickia* from *Draba*. These are, when translated, the following: (1) small boat-shaped sepals; (2) petals rounded at the tip; (3) closed lateral six-angled nectaries, which are joined with the median ones; (4) valves of the pod hard; (5) seeds smooth shining few and large, filling the aperture of the cells. When these characters are compared with those of the genus *Draba*, either including or excluding *Erophila*, it will be obvious that nos. 1 and 2 are of no diagnostic value. The subovoid hard pods are somewhat aberrant for *Draba* and suggestive of *Camelina*, but Schulz retains in *Draba* a number of species with inflated pods, as *D. sphaerocarpa* Macbr. & Payson. The rigidity of texture of the valves is a relative matter, and does not seem to the writers to be of generic value. Of the characters listed under (5), only the large size of the seeds seems worth discussing. When seeds are of the same nature, of the same manner of attachment, the mere fact that they grow larger in proportion in one species, would not seem to necessitate making that species a genus. Item no. (3) seems most important. The characters provided by the nectaries situated on either side of the base of the filaments have not been generally used in these genera, but they may well be of fundamental taxonomic value. On page 6 Schulz describes the nectaries as they occur in *Draba*, as restricted by him. They are lateral or median or both and fused into a ring, as well as many other forms. If all these types of nectaries are to be allowed in *Draba*, there seems no good reason for setting aside the one type described above. The genus *Draba* seems to the writers the best and most logical place for this species.

In any case the generic name *Cusickia* can not be used for this group, since it became a homonym before it was adequately described. In 1908 M. E. Jones[1] used the same name *Cusickia* for a genus of the Umbelliferae, which he published with a detailed description. It included the single species *C. minor* Jones. Hence the generic name *Cusickia* of Gray can not now be revived and legalized by the addition of a description.

11. **D. Nelsonii** Macbride and Payson, Am. Journ. Bot. 4: 259, 1917.

D. densifolia Nutt., f. *Nelsonii* (Macbr. & Pays.) O. E. Schulz, Pflanzenreich IV, fam. 105: 103, 1927.

Caespitose tufted perennial; root a strong dark vertical tap-root, not branching near the surface; crown multicipital at the surface, producing many short slender stems, these scaly below with the marcescent fragments of old leaves, and crowned with a cylindrical mass of erect or incurved rigid leaves; leaves all basal, linear thick acute cuspidate, the midrib prominent beneath, strongly ciliate with remote white stiff hispid hairs, otherwise glabrous, 5–7 mm. long, less than 1 mm. wide; scapes slender erect, sparsely pubescent below with simple or forked hispidulous hairs or glabrous, 1–4 cm. tall; inflorescence 4–9-flowered, in fruit forming a short

[1]Contrib. W. Bot. 12:39–40. 1908.

compact raceme, pedicels glabrous ascending, 2–5 mm. long; sepals greenish ovate-elliptic sparsely pilose with simple or forked hairs on the back or usually glabrous, 3–3.5 mm. long; petals yellow obovate, slightly cuneate at base, obtuse, 4–5 mm. long: stamens 6, 2–2.5 mm. long, the anthers elliptic to subcordate 0.3 mm. long, the filaments subulate; nectar glands large, the lateral ones deltoid, connected by the median ones to form two hippocrepiform ridges; pods flat and compressed, broadly and asymmetrically lanceolate, white puberulent with simple and forked hairs, 3–6 mm. long, 2–3 mm. broad; style 0.6–1 mm. long.

Distribution: Hudsonian. Type: Idaho: Exposed alpine summit, Antelope Mts., near Martin, Blaine Co., July 6, 1916, *Macbride & Payson* 3077.

Washington: Cascade Mts., 1882, *Brandegee* 373 in part.

Yakima County: Scab rock, summit of Bald Mt., 6,100 ft. alt., head of branch of Nile Creek, July 22, 1923, *St. John* 7851.

O. E. Schulz has reduced[1] this species to a forma under *D. densifolia* Nutt. He follows Macbride[2] in making *D. Mulfordae* Payson a synonym of *D. densifolia* Nutt. *D. densifolia,* however, has as conspicuous characters, stellate hairs on the leaves and the style 1.5–2 mm. long. Because of these and other characters, the writers are unable to concur with Schulz's reduction of *D. Nelsonii* to the rank of a forma.

Schulz assigns *D. Nelsonii* to a place in the Section *Chrysodraba.* This section is defined so that the present species is adequately included, as well as many other species of very diverse habit and character. The key, on the other hand, does not make the same impression. The choice comes between: "Folia rigida, angusta. Funiculi elongati.

Folia mollia, latiora, rarissime rigidula."

One would scarcely seek for a plant with linear rigid leaves under the second division.

12. D. ruaxes sp. nov.

Perennial, the subterranean branches freely branching and forming a caespitose tuft at the surface; lateral roots slender and fibrous, the principal roots deeply buried and not known; stems of each year's growth quickly buried by the loose sliding volcanic rocks, the leaf bases marcescent and long persistent, each stem bearing at the surface a small compact rosette of leaves; leaves all basal, oblanceolate to suborbicular sessile or subsessile densely white pilose with simple and forked hairs, hispid ciliate towards the base, thick and firm in texture, 3–7 mm. long, 2–4 mm. wide; aerial stems scapose slender, pilose with mostly simple hairs, 1–5 cm. tall; inflorescence small, but compact and subcapitate even in fruit, 3–6-flowered; pedicels very short at anthesis, but becoming 3–4 mm. long, ascending, loosely white pilose; flowers 3–4 mm. long; sepals ovate or ovate-lanceolate, scarious margined, white pilose with simple hairs, 2.5–3 mm. long; petals bright yellow, blade suborbicular broadly emarginate 3.5 mm. broad

[1] L. c. 103.

[2] Contrib. Gray Herb. n. s. 56: 52–53, 1918.

narrowed to a short claw; stamens 6, 3.5–4 mm. long, the anthers elliptic to oblong 0.4 mm. long, the filaments linear; nectar glands lateral large and triangular; pods ovate elliptic flattened, hispidulous with white simple hairs, 5–8 mm. long, 3–4 mm. broad, ovules about 18; style 0.7 mm. long.

Perennis scaposa, foliis omnibus radicalibus oblanceolatis vel suborbicularibus pilosis, scapis pilosis 1–5 cm. altis, floribus subcapitatis luteis, siliculis ovato ellipticis hispidulis, stylo 0.7 mm. longo.

Distribution: Arctic Alpine. Type: *St. John* 6590.

Snohomish County: Crevices of disintegrating flaky andesite, 8,000 ft. alt., north side of Glacier Peak, Washington, July 24, 1924, *Harold St. John* 6590 (type in Herb. State College of Washington).

British Columbia: Cliffs of Mt. Chris Spencer, 9,000 ft. alt., Coast Range Mts., lat. 51 degrees, July 7, 1928, *Mrs. Don Munday* 88 (Hb. Prov. Mus. B. C.); on cliffs, Fury Gap, 8,500 ft., July 6, 1928, *Munday* 21 (I) (Hb. Prov. Mus. B. C.).

The collector has a vivid recollection of the locality where this plant was found. He led an expedition in to explore the unknown north side of this beautiful snow-capped volcano. From the main camp on the Whitechuck River, two days of arduous back-packing established a high camp at 5500 feet in the open alpine meadows near the head of Fire Creek. On July 24th the attempt was made with Dr. J. R. Neller to climb Glacier Peak. The ascent was only 5000 feet and the distance not over five miles, and the route looked easy along a continuous ridge. Closer acquaintance with the area, however, revealed knife-edge ridges, cliffs, steeply sloping snow fields, and glaciers deeply cut by crevasses. Twelve hours of continuous climbing found the party still 500 feet from the summit, and the fear of darkness caused a retreat. At a spot near the 8,000 foot level, a series of cliffs caused the climbers to leave the ridge and skirt its side above the Kennedy Glacier. To reach the ridge again, it was necessary to climb up through a steep gully. Here the andesitic lava was shattered in a very peculiar way. It was broken into flat flakes about the size and shape of a person's hand. They were in a vertical position and stacked in loosely like cards. Each step started a landslide down the precipitous gully and threatened to take the climber with it. Between the loose flakes of this lava grew the perennial bright yellow *Draba* here described as new. The specific name is taken from the Greek ῥύαξ, meaning a volcano.

The closest relative of this new species is *D. ventosa* Gray, described from *Parry* 15, collected at Snake Pass, Wyoming, in 1873. This may be distinguished by having its pods acute at apex, pubescent with slender stellate hairs; the sepals stellate pubescent; the scapes densely slender stellate; and the leaves densely slender white stellate or forked pubescent on both sides. On the other hand, *D. ruaxes* has the pods not acute at apex, short hispid; the sepals pilose with simple hairs; and the leaves pilose with simple and forked hairs. *D. Howellii* Wats. and *D. sobolifera* Rydb. have been treated as synonyms of *D. ventosa* Gray by Payson in his monograph.[1] Even if these variants should prove worthy of separation, they are easily distinguished from *D. ruaxes*. *D. Howellii* is sparingly stellate

[1]Am. Journ. Bot. 4: 264, 1917.

throughout, with pedicels 6–11 mm. long, with petals 6–8 mm. long, and with the style 2 mm. long. *D. sobolifera* has the pedicels 7–8 mm. long, and the pods finely stellate. This new species may also be compared with *D. uncinalis* Rydb. but this has pods 3 mm. wide and 3–4 mm. long, and the basal leaves sparingly stellate.

D. ruaxes falls into the Section *Chrysodraba* of Schulz's treatment.

13. **D. caeruleomontana** sp. nov.

Caespitose perennial; tap root slender and vertical, the lateral roots deep seated; branches slender straw colored numerous ascending, leafy up to the rosette but not densely so and not appearing pulvinate; leaves all basal linear or very slightly spatulate rigid slightly divergent, the midrib prominent beneath, sparsely pubescent above and below with mostly stellate hispid hairs, ciliate throughout with remote rigid white hispid hairs 0.7–1 mm. long, acute and cuspidate, 0.8–1.8 cm. long, 1–1.5 mm. broad; scapes sparsely hispid below with simple and a few forked hairs, glabrate above, 5–16 cm. tall; inflorescence loose, markedly so at fruiting time, glabrate, 10–20 flowered; pedicels glabrous slender ascending, 3–25 mm. long; sepals oblong ovate yellowish green, hispid on the back with simple and forked hairs, the outer pair broader, 3–4 mm. long; petals yellow with a suborbicular shallowly emarginate blade, narrowed to a short broad claw, 4–5.5 mm. long, 3 mm. broad; stamens 6, 3–4 mm. long, the anthers broadly oblong to suborbicular 0.8–0.9 mm. long, the filaments subulate large and dilated below; nectar glands lateral large triangular and pyramidal; pods flat compressed glabrous, elliptic lanceolate to ovate lanceolate, many nerved, about 10–ovuled, 4–7 mm. long, 2–3 mm. broad; style 0.5–0.8 mm. long; seeds brown ovoid wingless, 1.3 mm. long.

Perennis, foliis rosulatis linearibus hispido-ciliatis sparse stellatis, 7–18 mm. longis 1–1.5 mm. latis, scapis sparse hispidis superne glabratis 10–20-floris, petalis luteis suborbicularibus emarginatis 4–5.5 mm. longis, glandulis deltoideis magnis, siliculis compressis elliptico-lanceolatis 4–7 mm. longis, 2–3 mm. latis, stylo 0.5–0.8 mm. longo.

Distribution: Hudsonian. Type: *Brode* 3.

Columbia County: Bare basalt crevices, 6025 ft. alt., summit of Table Rock, T. 6 N., R. 39 E., September 23, 1928, *St. John, Moore, Smith & Van Amburg* 9652.

Walla Walla County: Rock crannies, 5,000 ft. alt., Lewis Peak, Blue Mts., May 27–29, 1923, *M. D. Brode* 3 (type in Herb. State College of Washington); in rock crevices, alt. 4,500 ft., Blue Mts., July, 1896, *Piper* 2404 in part.

D. caeruleomontana Payson & St. John is a member of the Section *Chrysodraba* according to the treatment by O. E. Schulz, though it will run there in his key only with difficulty and only after the elimination of the Section *Aizopsis*. In this monograph it would come next to *D. globosa* Payson, though it most closely resembles *D. laevicapsula* Payson. The latter species may be distinguished by having the leaves 7–10 mm. long, usually obtuse, not rigid, pubescence loosely stellate with weak marginal cilia near

the base; the inflorescence 2 cm. long in fruit. *D. caeruleomontana* has the leaves 8–18 mm. long, acute rigid, stellate hairs sparse and hispid, with strong hispid cilia throughout; the inflorescence 5–13 cm. long in fruit.

13a. **D. caeruleomontana** Payson and St. John, var. **Piperi** var. nov.

It differs from the species by having the pods densely white puberulent with simple and forked hairs.

A specie differt in siliculis puberulis.

Distribution: Hudsonian. Type: *Piper* 2404 in part.

Walla Walla County: In rock crevices, alt. 4,500 ft., Blue Mts., July, 1896, *C. V. Piper* 2404 in part (type in Herb. State College of Washington.)

This new variety most closely resembles *D. densifolia* Nutt. (*D. Mulfordae* Payson), which can be recognized by having the leaves obtuse, not rigid, 5–10 mm. long, 1–2 mm. broad; the sepals 2.5–3 mm. long; and the style 1–2 mm. long. *D. caeruleomontana*, var. *Piperi* differs by having the leaves acute rigid, 8–18 mm. long, 1–1.5 mm. wide; the sepals 3–4 mm. long; and the style 0.5–0.8 mm. long.

14. **D. Paysonii** Macbr., Contrib. Gray Herb. n. s. 56: 52, 1918.

D. vestita Payson, Am. Journ. Bot. 4: 261, 1917, not Davidson.

D. densifolia Schulz in part, Pflanzenreich, IV, fam. 105: 103, 1927.

Densely caespitose perennial; crown multicipital, producing many short stems, these densely clothed with a cylindrical mass of marcescent leaves; leaves all basal, broadly linear to narrowly oblanceolate thin, not rigid, ascending appressed and imbricate, soft pubescent with long hairs, these simple branched or stellate, long ciliate with white hispid hairs, often glabrate above especially towards the base, 5–12 mm. long, 1–13 mm. broad; scapes erect long pilose with simple and forked hairs, 1–3 cm. tall; inflorescence short compact and corymbose even in fruit, 3–6 flowered; pedicels pilose with simple and forked hairs, 1–5 mm. long; sepals broadly elliptic densely pilose on the back with simple and forked hairs, 3–4 mm. long; petals yellow obovate slightly emarginate, narrowed to a short slender claw, 3–4 mm. long; stamens 6, 1.5–2.5 mm. long, the anthers oblong 0.5–0.7 mm. long, the filaments subulate and dilated at the point of attachment; nectar glands large, the lateral deltoid and pyramidal, connected by the median into a hippocrepiform shape; pods flat compressed lance-ovate, densely white pilose with mostly simple hairs, 5–8 mm. long, 2.5–4 mm. broad; style 0.5–1 mm. long; seeds 8–10, dark brown, 1 mm. long.

Distribution: Hudsonian or Arctic-Alpine. Type: Upper Marias Pass, August 3, 1883, *Canby* 28.

Washington: Cascade Mts., 1882, *Brandegee* 373 in part.

Skamania County: At 6,000 or 7,000 ft. alt., Chiquash Mts., August 26, 1895, *Suksdorf* 2426. This specimen differs somewhat from the typical plants in having its leaves somewhat longer more rigid more divergent and the pubescence sparser. However, these points seem to be within

the normal range of variation and the specimen seems properly included within this species. It has been carefully compared with the type specimen.

O. E. Schulz lists *D. Paysonii* in the synonymy of *D. globosa* Payson, var. *sphaerula* (Macbride and Payson) Schulz. The various characters detailed in the above description will show why the writers do not concur with Schulz's treatment.

15. **D. incerta** Payson, Am. Journ. Bot. 4: 261, 1917.

D. oligosperma Hook., var. *pilosa* (Regel) Schulz, in part, Pflanzenreich IV, fam. 105: 101, 1927.

Perennial, caespitose and loosely tufted; tap-root slender and rather freely branching; caudex multicipital, producing numerous slender somewhat spreading short branches, these scaly from the marcescent petiole bases; leaves all basal, bright green, linear oblanceolate, not rigid, stellate with weak slender hairs throughout and ciliate towards the base with weak short pilose simple hairs, in age more or less glabrate on the upper surface towards the base, 7–10 mm. long, 2–4 mm. wide; scapes sparsely pilose with slender stellate hairs, 4–12 cm. tall; inflorescence 3–14-flowered, in fruit becoming a loose raceme; pedicels rather stout, ascending sparsely stellate and glabrate, 3–15 mm. long; sepals unequal elliptic ovate, saccate at base, yellowish, sparsely pilose on the back, 3 mm. long; petals yellow oblanceolate truncate, 5 mm. long; stamens 6, 2.5–3 mm. long, the anthers elliptic 0.5 mm. long; nectar glands lateral conical in shape; pods flat and compressed broadly lanceolate, white puberulent with stellate and mostly simple hairs, 4–8 mm. long, 2–3 mm. broad; style 0.5–0.9 mm. long; seeds about 20, neither winged nor margined.

Distribution: Hudsonian. Type: Wyoming: among rocks on the summit, the Thunderer, Yellowstone Park, July 13, 1899, *A. Nelson & E. Nelson* 5818.

Washington: Cascade Mts., 1882, *Brandegee* 371; Cascade Mts., *Lyall* in 1860.

Chelan County: One tuft on mica schist ridge, Indian Head Peak, 7,000 ft. alt., Valley of the White River, July 31, 1921, *St. John* 4840.

Yakima County: Small volcano at base of Mt. Adams, July 12, 1899, *Flett* 1131.

The *Lyall* specimen cited above may or may not be the same as one of the three cited by O. E. Schulz under the *D. oligosperma* aggregate. The specimen in the Gray Herbarium gives no elevation, while that seen by Schulz in the Kew Herbarium had the elevation stated.

15a. **D. incerta** Payson, var. **laevicapsula** (Payson) comb. nov.

D. laevicapsula Payson, Am. Journ. Bot. 4: 262, 1917.

Further study has shown the close relationship of this plant to *D. incerta*. In fact, it seems to differ only by the lack of any pubescence on the capsules. It is somewhat less frequent, but occurs within the range of the species. As previously stated in the discussion of similar cases, one of the pair is considered a variety of the other.

DISTRIBUTION: Hudsonian. TYPE: Idaho: summit of Steven's Peak, Coer D'Alene Mts., August 5, 1895, *Leiberg* 1477 (Rocky Mt. Herb.).

YAKIMA REGION: In 1882, *Brandegee* 373 in part (Hb. U. Calif.).

DOUBTFUL RECORDS

Draba barbata Pohle, var. *Treleasii* (Gilg) O. E. Schulz, Pflanzenreich IV, fam. 105: 102, 1927. WASHINGTON: Yakima Region (Brandegee, 1882). This is undoubtedly one of the collections made on the Northern Transcontinental Survey, in connection with the Northern Pacific Railway. Search has been made for this in vain in the Herbarium of the New York State College of Pharmacy, and in the U. S. National Herbarium. Collections from this set were seen in the Rocky Mountain Herbarium and in the Herbarium of the University of California. Each contained two sheets, nos. 371 and 373. The former number included one species, and the latter four species, none of which answer to the description of *D. barbata*, var. *Treleasii*. While awaiting confirmation, this plant is listed among those doubtfully present in the State of Washington.

Draba oligosperma Hook., var. *andina* Nutt., f. *hirtiscapa* O. E. Schulz, Pflanzenreich IV, fam. 105: 100, 1927. OREGON: Ostseite der Cascade Mts., auf den Gipfeln, 49° n. Br., 2,500 m. ü. M. (Lyall, Oreg. Bound. Commiss. 1860). Many specimens of this plant have been examined from the Wallowa and the Rocky Mountains, including two of Lyall's, but none from the Cascade Mountains of Washington. No sheet of this could be found among the Lyall duplicates in the Gray Herbarium.

D. oligosperma Hook., var. *pilosa* (Regel) O. E. Schulz, Pflanzenreich IV, fam. 105: 101, 1927. OREGON: Ostseite der Cascade Mts. auf den Bergspitzen 49° n. Br., 2,500 m. ü. M. (Lyall, Oreg. Bound. Commiss. 1859, auch subvar. *leiocarpa*, hb. Kew). This record is difficult to interpret. Schulz does not publish, list, describe, or index any subvar. *leiocarpa* of *D. oligosperma*. The specimen cited above is listed under var. *pilosa*, but it, like the majority of other specimens, is indicated as subvar. *leiocarpa*. On page 99 there is a var. *leiocarpa* Schulz, but these same specimens are not listed under that variety. If the statement subvar. is to be interpreted as referring the reader to look under var. *leiocarpa*, at least the typographical error occurs eight times in the same paragraph. Also on page 100 Schulz refers several plants to var. *leiocarpa* without using the "sub". No specimen of this collection could be found in the Gray Herbarium, and the published record is too involved to be accepted without verification.